PlantingScience – Agronomy Feeds the World
Key Concept: Field to Table

Key Concept #1: Field to Table – From where does food come and how does it get there?

Overview

Goals, purposes and objectives centered around a core concept (big idea)

-Where exactly does my food come from: Field to table?

Objectives (Six key concepts):

-Understand the connection between our food and farms
- Determine the infrastructure necessary to transport food
- Understand the costs associated with different foods
- Understand how political systems impact food
- Understand the health impacts of food production
- Understand how the food we eat impacts the environment

Suggested sequence of concept development

-Introductory lecture from teacher
- Whole class brainstorming, teacher-guided discussion of field to table components (conceptual diagram to identify 6 key concepts; "Food and farm" "Food and transportation" "Food and economics" "Food and politics" "Food and health" and "Food and environment")
-Brief discussion of six key concepts with scientist mentor

Related concepts and threads identified

- Geography and Water
- Plant Nutrition and Soil Fertility
- Plant Stresses

Key Skills Identified

-Understand overall objectives
-Understand the spatial and temporal scales of food production
- Synthesize research material pertaining to topic of interest
-Identify good research sites
-Ability to communicate findings in written, visual, and oral forms

Formative and summative assessments related to identified concepts and skills

Discussion topics to cover with students prior to start of hands-on activities.

Formative

-Did students identify each field to table component?
-Did the students address scale (local, regional, national, international)?
-Did they present their findings in an organized and logical fashion?
-Did the students come away with a proper understanding of the outcomes of the exercise?

Summative

-Have the students identified the components of field to table?
-Do the students understand what is involved with each component and how they differ over scale and time?
-Have the students gained the appropriate insight into agronomy and the food system?

Suggested timeline

-Brainstorming activity should be done within one class period. Lecturing, brainstorming, and discussion with mentor should take one hour.

Background Information

By the end of this project, students should be able to answer questions related to the journey their food takes from the field to their table. Start by asking if students have ever thought about where their food comes from. Help them understand their food has gone on an incredible journey that starts in the field (or garden, greenhouse, etc.) and ends in their schools, homes, and restaurants. After completion of the module, students should be able to answer the questions below. Example answers are given and may be modified based on relevant regional examples and student experiences.

Student question: *Where is food grown? What is a farm? Who is involved in farming and what do they do?*

Teacher answer: Food is grown on farms, which are areas of land used for growing crops and raising animals and are typically owned by farmers. Farmers live all over the world and grow almost any food you can think of! Farmers start out by planting seeds in the spring. They take care of the seeds, fertilizing them, keeping weeds away, and watering when needed. After the crops have been growing for a few months, the parts of the plant start to develop into what you will eat (corn cobs, for example), and the farmer's job is to harvests this food. Food can, however, come from other places such as gardens, greenhouses, and your back yard!

Student question*: Where does the food go once the farmers harvest it? How does the food get there?*

Teacher answer: Sometimes the farmer harvests crops and feeds them to his/her animals, but sometimes farmers sell their harvested crops to other farmers or large companies to feed animals. Some of the crops farmers harvest are sold directly to you and I, while the rest of the food goes to processing plants.

Student question: *How are different foods processed, packaged, and then sold to the consumer? Who is involved in these processes?*

Teacher answer: Foods sold directly to consumers at farmers markets have had minimal processing, sometimes only a light washing. Foods that are shipped to be sold at stores or foods that are going to be packaged often have more processing such as rinsing with chemicals to prevent microbial growth or cooking. Foods are then packaged and transported to a store you can purchase them from. This entire process may involve a farmer, truck driver, processing plant employees, and grocery store employees.

Student question: *How does region impact how foods are grown, harvested, transported, packaged, and consumed? What key concepts tie into this question? How might this be different for people in other countries?*

Teacher answer: Different crops grow well in some regions while some do not. For example, oranges may grow in Florida, but it is too cold to grow them in Minnesota. Some crops may need lots of water to grow, but are being grown in a dry place because the farmer uses irrigation. Have the students name some of the crops grown in your area and help them consider if the crops would be able to grow in that area without help from the farmer. The same concept applies to regions in other countries, but economics and politics can play an even larger role. For example, a farmer in Africa may have the perfect land to grow dryland rice, but they may not be able to afford the seed or face political pressure to grow another crop. The discussion of this question may encompass all key concepts.

Student question: *What role does economics play in field to table?*

Teacher answer: First, farmers must consider how much initial investment it will take to grow a crop (fertilizer, seed, gas, etc) and how much money they might potentially make off of selling the crop. It is important to note that food prices fluctuate, so in considering economics farmers are taking a risk that may or may not pay off. Once the crop has left the farm, transportation and storage costs play a role. It often costs more money to transport food over greater distances which is why food is moved by semi-trucks, planes, and boats. Processing food require more inputs and therefore more money, increasing the cost per unit of food, but also making food more accessible year-round. Then, consumers must consider expenses when

purchasing food. An indirect cost associated with food production is human and environmental health.

Student question: *How does food impact human health? Environmental health?*

Teacher answer: Many on-farm practices and government regulations exist to protect both human and environmental health. Human health problems can come from all areas of the field to table process including the farm field, handling of produce, cleaning and processing, packaging, storage, and in-home contamination. Some examples of how environmental health can be impacted are on-farm management practices, by transporting food across country which increases our carbon footprints, and by processing food.

Resources/Additional information

-Farm to School Youth Leadership Curriculum: The Institute for Agriculture and Trade Policy (http://www.iatp.org/files/F2SCurriculum_full_IATP_web_0.pdf)
-"Your Food, Farm to Table:" Youtube (https://www.youtube.com/watch?v=K1XbEpNZ5yk)
-Teaching the Food System: Johns Hopkins (http://www.jhsph.edu/research/centers-and-institutes/teaching-the-food-system/curriculum/)
-National Farm to School Network (http://www.farmtoschool.org/)
-Building Local and Regional Food Systems: SARE (http://www.sare.org/Learning-Center/Topic-Rooms/Topic-Briefs/Building-Local-and-Regional-Food-Systems)
- FDA http://www.fda.gov/Food/default.htm
- FDA Food Safety Modernization Act http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm304045.htm
-FAO (Food and Agriculture Organization of the United Nations) http://www.fao.org/home/en/
- United Nations: Global Issues- Food (http://www.un.org/en/globalissues/food/links.shtml)
-Agriscience textbook (http://www.case4learning.org/index.php/delmar-textbooks/agriscience-fundamentals-and-applications-5th-ed-detail)

"Hooks" for engaging students

-What did you eat for lunch today and where did those ingredients come from?
-Feeding 9 billion people by 2050, what resources will that involve?
-All the possible jobs in the food industry
-Growing your own food at home. Have you grown food before? Was it fun? Was it difficult?
-What crops can you grow at home and what do you have to buy from the store?

Open-ended juicy questions for discourse

-What aspects of field to table will need to change in order to feed 9 billion people by 2050?

-How many people "touched" the food on your plate since it left the farm? How does that change for different foods?
-What technologies can we develop to improve field to table? How will those technologies work and how can they be implemented?
-Not all food comes from farms. What other places can food come from and how does this affect the six field to table subtopics?
-What is the importance in understanding the food system?